



Application Guide

Kenwood Radio

Series 80, 90 and 150/180

To IP-223

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1 General

The application note is intended to show how to assemble the cable and setup the hardware of the IP223 for channel change and FleetSync applications using Kenwood radio.

2 Setup

2.1 TK-x150/180 Model Cable Assembly:

NOTE: There are differences between the TK-x150 and TK-x180 radios DB25 connectors. If COR is used, pin 20 (TK-x150 an output only) will be programmed for that function and the cable will route that signal to the IP-223. On the TK-x180 the same pin is a general purpose I/O and has an additional 470 ohm series resistance added. This requires that the IP-223 external pull-up resistance must be removed. Jumpers J8 (Line 1) and J30 (Line 2) should be placed in a neutral position (neither A or B, hanging).

The tables below show the assembly cable for the TK-x150 model radios.

Signal	IP223 DB25	TK-x150 Radio DB25
<i>Ground</i>	7	7
<i>PTT Common</i>	2	7
<i>PTT</i>	14	12 (Aux Input 4 Programmable)
<i>COR</i>	20	20 (Aux Output 1 Programmable)
<i>RX+</i>	24	17
<i>TX+</i>	25	6

IP223 Serial Signal	IP223 DB9		TK-x150 Radio DB25
	Line 1	Line 2	
<i>TXD</i>	2	8	2
<i>RXD</i>	3	7	3

For IP223 Rev F board or later make sure jumper J35 is in “A” position for line 1 and jumper J26 is in “A” position for line 2.

2.2 TK-x80 Model Cable Assembly:

The KCT-19 accessory cable from Kenwood radio is needed and the 'E' connector is connected to CN4 inside the radio to establish the serial communication.

The tables below show the assembly cable for the TK-x80 model radios.

Signal	IP223 DB25	KCT-19 Accessory Conn.
<i>Ground</i>	7	6
<i>PTT Common</i>	2	6
<i>PTT</i>	14	8
<i>COR</i>	20	11
<i>RX+</i>	24	12
<i>TX+</i>	25	5

2.2.1 IP223 Rev F or higher Board Configuration:

Set the jumper J35 to B position for line 1 and the jumper J26 to B position for line 2

IP223 Serial Signal	IP223 DB9		KCT-19 Accessory Conn.
	Line 1	Line 2	
<i>TXD</i>	9	4	14
<i>RXD</i>	1	6	15

2.2.2 IP223 Rev A to Rev E Board Modifications:

Lift Pin 12(line 1) or pin 9(line 2) of U45 according to the line selected and solder to its PCB Pad. Please refer to the *Figure 1* for better demonstration.

IP223 Serial Signal	Pin on U45 of the board		KCT-19 Accessory Conn.
	Line 1	Line 2	
<i>TXD</i>	11	10	14
<i>RXD</i>	To the pad of pin 12	To the pad of pin 9	15

2.3 TK-x90 Model Cable Assembly:

The tables below show the assembly cable for the TK-x90 model radio.

Signal	IP223 DB25	TK-x90 Radio DB25
<i>Ground</i>	7	7
<i>PTT Common</i>	2	7
<i>PTT</i>	14	2 Aux Input (Programmable)
<i>COR</i>	20	20 AO1 (Programmable)
<i>RX+</i>	24	17
<i>TX+</i>	25	13

2.3.1 IP223 Rev F or higher Board Configuration:

Set the jumper J35 to B position for line 1 and the jumper J26 to B position for line 2

IP223 Serial Signal	IP223 DB9		TK-x90 Radio DB25
	Line 1	Line 2	
<i>TXD</i>	9	4	10
<i>RXD</i>	1	6	9

2.3.2 IP223 Rev A to Rev E Board Modifications:

Lift Pin 12(line 1) or pin 9(line 2) of U45 according to the line selected and solder to its PCB Pad. Please refer to the *Figure 1* for better demonstration.

IP223 Serial Signal	Pin on U45 of the board		TK-x90 Radio DB25
	Line 1	Line 2	
TXD	11	10	10
RXD	To the pad of pin 12	To the pad of pin 9	9

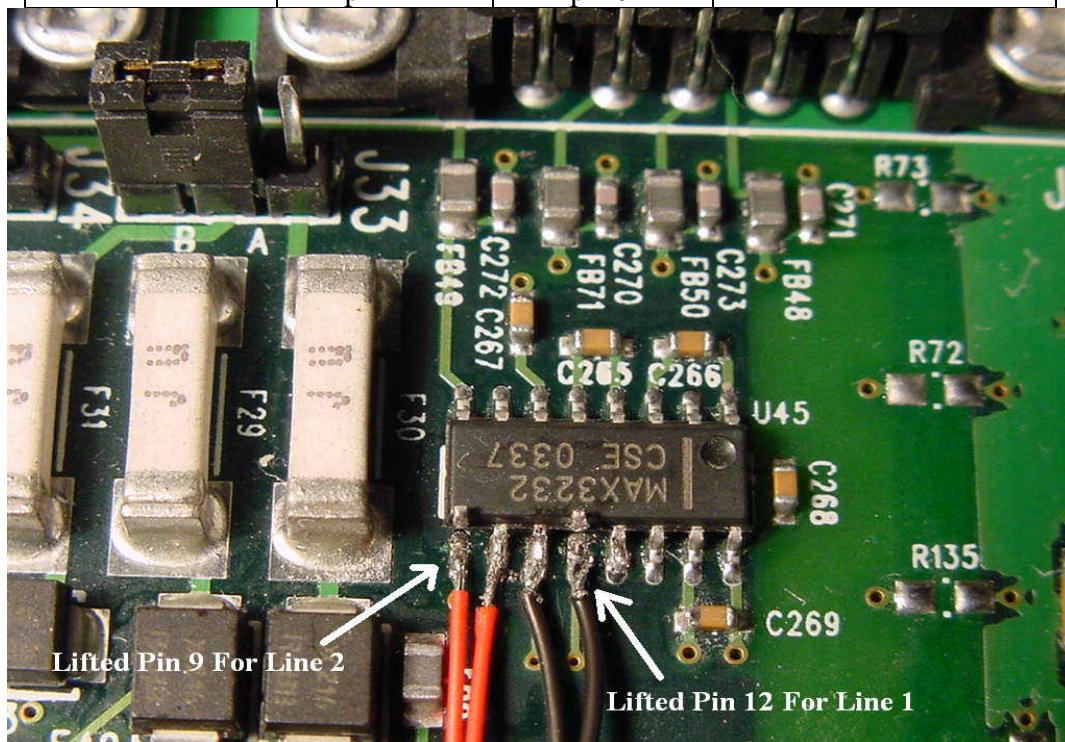


Figure 1

2.4 IP223 Configuration:

Setup the desired IP223 line for Kenwood radio control at the following screen:

2.4.1 Per-line setup screen

Line Number 2 Setup

Port Enabled: ☒

Line Mode: ☒ Local Mode ☐ Tone Mode ☐ Console Mode

PTT Relay: ☒ PTT relay only ☐ PTT + R1 ☐ PTT + R2

Monitor Relay: ☒ Reset with PTT ☐ On except PTT ☐ Timed

Serial Port Mode: **A** Fleetsync Series 90 Serial Port Parameters: 9600.N.8.2 **B**

Function Tone [Enable]:

	Relay	Relay Group	Relay Time (ms)	Digital Output	CTCSS Freq	CTCSS Default	Talk Group	Chan
1	<input checked="" type="checkbox"/>	1	0	1	1	<input type="checkbox"/>	1	1
2	<input checked="" type="checkbox"/>	R01	0	3	33	<input type="checkbox"/>	1	2
3	<input checked="" type="checkbox"/>	R02	0	7	5	<input type="checkbox"/>	1	3
4	<input checked="" type="checkbox"/>	BOTH	0	15	37	<input type="checkbox"/>	1	4
5	<input checked="" type="checkbox"/>	1	0	31	9	<input type="checkbox"/>	1	5
6	<input checked="" type="checkbox"/>	R01	0	63	41	<input type="checkbox"/>	1	6
7	<input checked="" type="checkbox"/>	R02	0	127	13	<input type="checkbox"/>	1	7
8	<input checked="" type="checkbox"/>	BOTH	0	0	45	<input type="checkbox"/>	1	8
9	<input checked="" type="checkbox"/>	1	0	1	17	<input type="checkbox"/>	0	0
10	<input checked="" type="checkbox"/>	R01	0	3	49	<input type="checkbox"/>	0	0
11	<input checked="" type="checkbox"/>	R02	0	7	21	<input type="checkbox"/>	0	0
12	<input checked="" type="checkbox"/>	BOTH	0	15	53	<input type="checkbox"/>	0	0
13	<input checked="" type="checkbox"/>	1	0	31	25	<input type="checkbox"/>	0	0
14	<input checked="" type="checkbox"/>	R01	0	63	57	<input type="checkbox"/>	0	0
15	<input checked="" type="checkbox"/>	R02	0	127	29	<input type="checkbox"/>	0	0
16	<input checked="" type="checkbox"/>	BOTH	0	0	61	<input type="checkbox"/>	0	0

OPTIONS: ☒ Supervisor ☒ Cross Mute ☐ Full Duplex ☒ RxAGC

☒ Hi-Pass RX ☐ Pre-Emphasize TX ☐ TX Monitor ☐ 2 Wire

LAM Level: -10 dB LAM Time: 2 sec ☒ Fleetsync ANI ☐ 2400 baud

CTCSS Mode: ☐ Always On ☒ On with PTT ☐ MDC ANI ☐ MDC 2400 baud

COR: ☒ COR Active ☐ COR Active High

TX Delay: 50 ms RX Delay: 50 ms Squelch Tail Delay: 0 ms

C

Choose radio model in the Serial Port Mode box (A).

Change Serial Port Parameter box to 9600.N.8.2 (B).

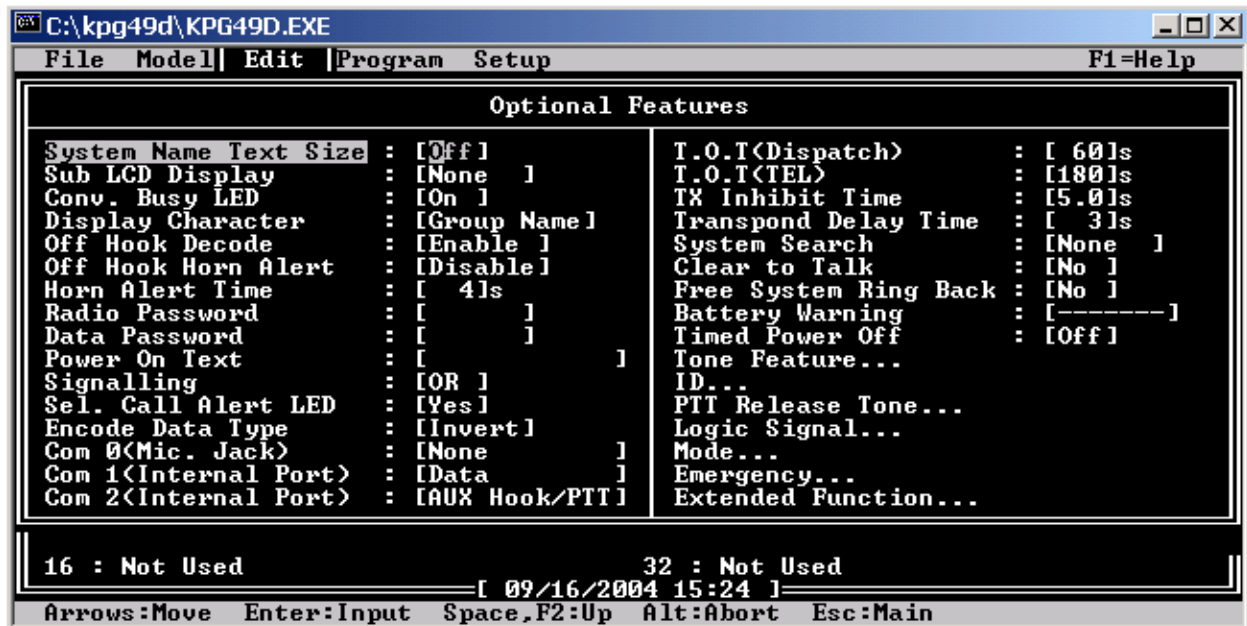
Configure Talk Group and CHAN fields for channel change capability (C).

2.4.2 IP223 Jumper settings

Line 1	Jumper setting	Line 2
J33, J34	"B"=4-wire	J5, J6
J16, J21	"A"=Single ended	J19, J20
J14	"A"= 600	J24
J3, J9, J11	"A"=Single ended	J25, J28, J29
J13	"B" High	J27
J17, J22	"B"= 600 ohms	J10, J15

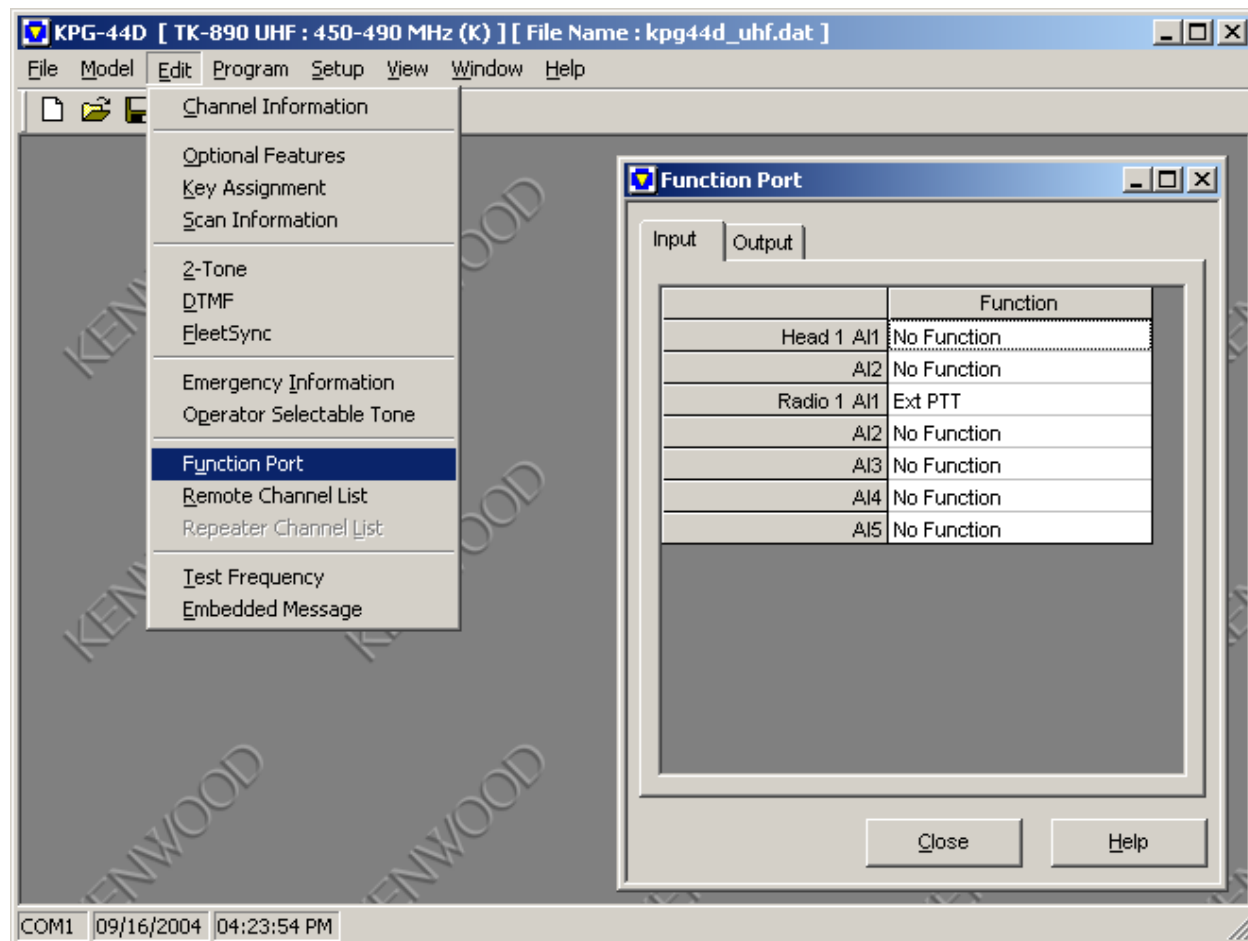
2.5 Radio Configuration

2.5.1 TK-x80 Series

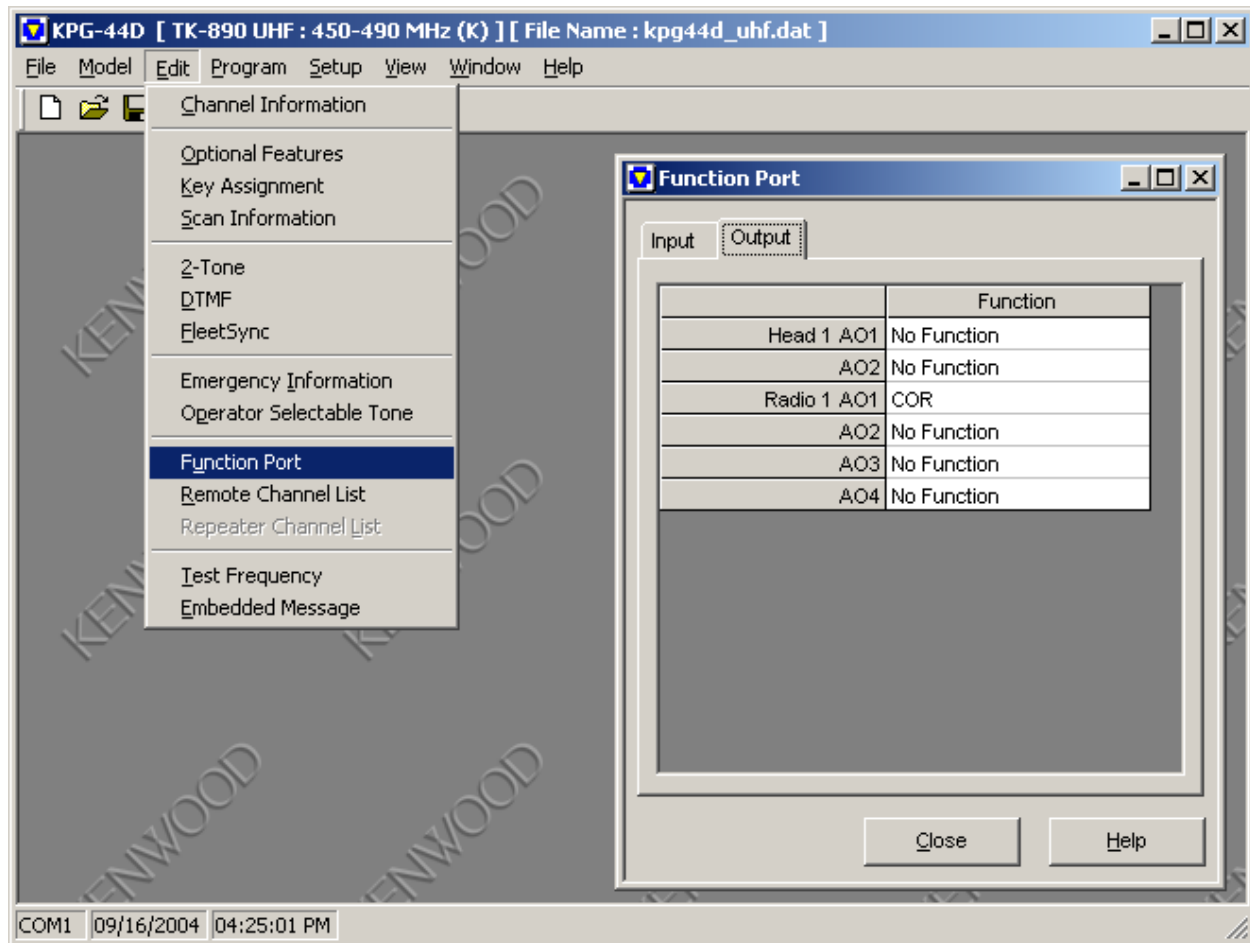


Program Com 1 for DATA

2.5.2 TK-x90 Series

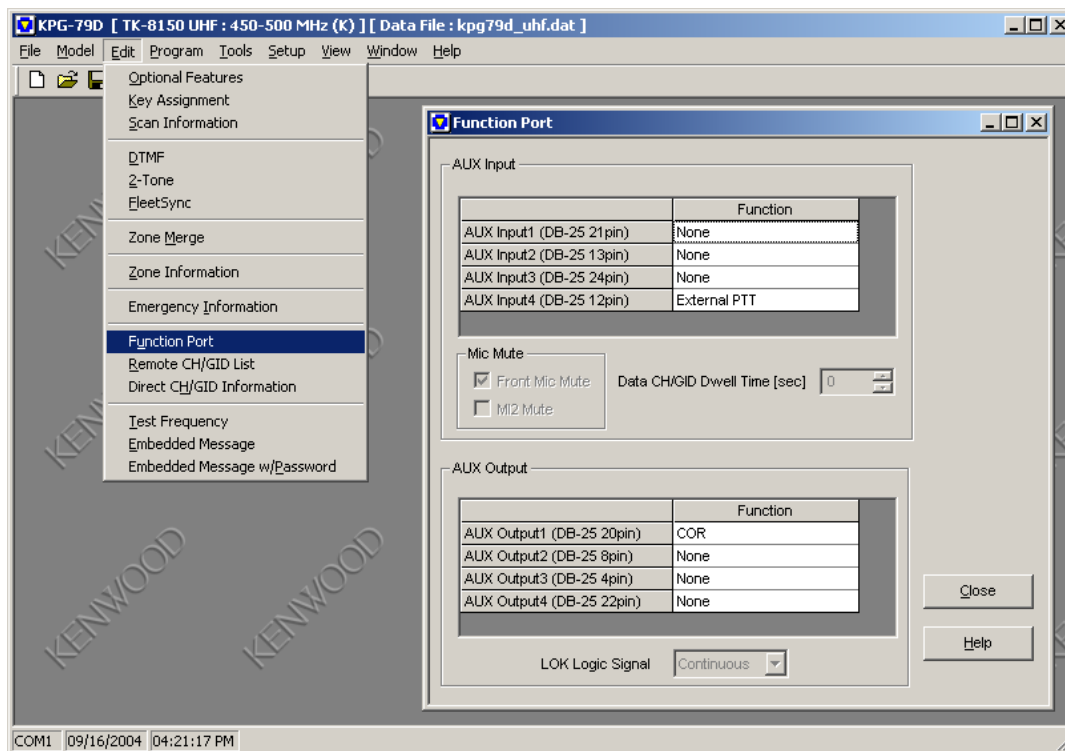


Program Function Port, Input screen for Ext PTT in Radio 1 A11.

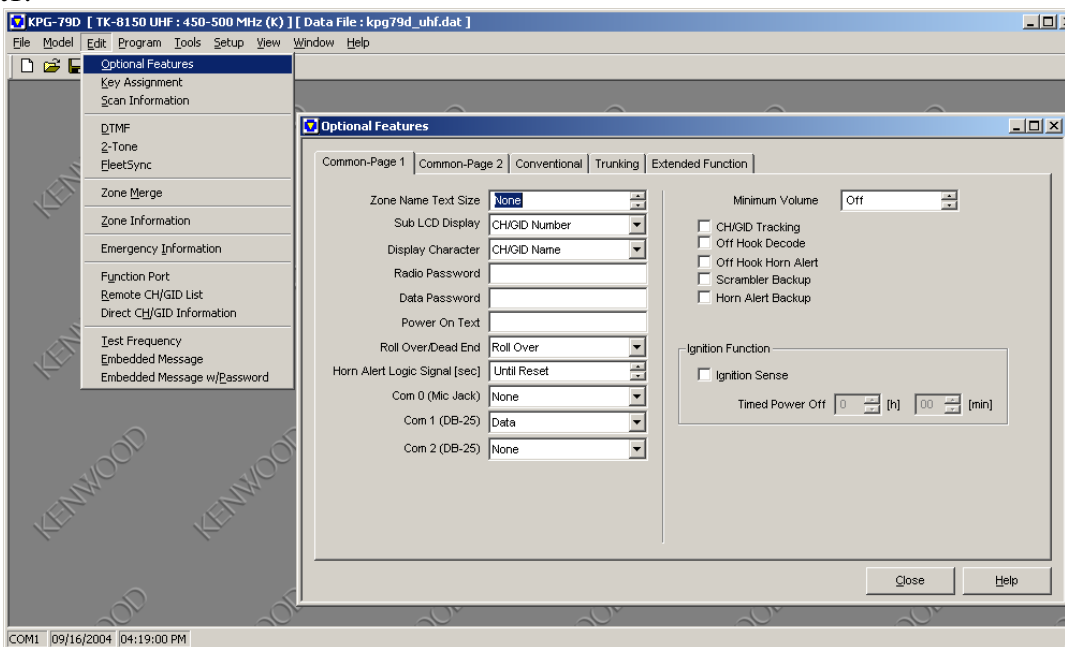


Program Function Port, Output screen for COR in Radio 1 AO1.

2.5.3 TK-x150/180 Series



Program Function Port, Aux Input for External PTT in AUX Input4 location and COR in AUX Output1.



Program Com 1 for DATA

For the TK-x180, the AUX programming screen is different. Please note that the same interface cable is used for both the TK-x150 and TK-x180 radios. If COR is used, IP-223 Jumper 8 (Line 1) or Jumper 30 (Line 2) will have to be placed in a neutral position for the Aux port pin 20 on the TK-x180 to function properly as COR.

The screenshot shows the 'Extended Function' window with the 'AUX' tab selected. At the top, there are tabs for 'Optional Board', 'AUX', 'Remote Zone-CH/GID', and 'Modulation Line'. Below these is a dropdown for 'External Device' set to 'None'. A table lists pin configurations for DB-25 connectors. Below the table are sections for 'AUX Input' (including Data Dwell Time, Mic Sense, and Data Override) and 'AUX Output' (including LOK Logic Signal and Mic Mute options).

Pin No.	I/O	Function	Active
DB-25 4pin	Output	None	Low
DB-25 8pin	Output	None	Low
DB-25 12pin	Input	External PTT (Voice)	Low
DB-25 13pin	Input	None	Low
DB-25 15pin	Output	None	Low
DB-25 16pin	Output	None	Low
DB-25 20pin	Output	COR	Low
DB-25 21pin	Input	None	Low
DB-25 22pin	Output	None	Low
DB-25 23pin	Input	None	Low
DB-25 24pin	Input	None	Low

AUX Input
 Data Dwell Time [s]: 0
 Mic Sense: Normal
☐ Data Override

AUX Output
 LOK Logic Signal: Continuous
 Mic Mute:
☒ Front Mic
☐ M12

TK-x180 auxiliary setup screen

Suggestions or Comments

We'd appreciate your input. Please send us your suggestions or comments concerning this application note, by fax (402-467-3279) or e-mail them to: **vega@telex.com**

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